Energy self-assessment

The following checklist has been designed to assist producers in assessing their power use and identifying ways that they can reduce it.

In addition to the positive environmental impacts of reducing power and therefore emissions, it will also result in lower energy-associated costs for producers.

#	Potential Trigger	Response	Info
1	Is my Power Factor (PF) poor / below allowable levels (i.e. <0.8)?	☐ **Y:** Take action immediately to improve PC i.e. install Power Factor Correction (PFC) capacitor equipment. ☐ **N:** Go to #2.	PF data can be requested from your power retailer; or divide kW / kVA to calculate PF. PF changes continuously – it is the PF when you are using the most power that is of highest interest.
2	Is my Power Factor < 0.9 ?	☐ **Y:** You may need to increase PF to adhere to your power service agreement and / or there may be an economic advantage in PFC. ☐ **N:** Go to #3.	Contact an industrial electrician to discuss PFC. Generally, businesses should target a PF of 0.9 to 0.95. You can complete a quick payback period by dividing the cost of the PFC installation ($) by the money you would save each year ($ per year) to work out the payback period (years).
3	Is the voltage at my site above what I need for my electrical equipment? i.e. 415 V when only 400V is required.	☐ **Y:** consider Voltage Optimisation (VO) equipment. ☐ **N:** Go to #4.	Consult your electrical contractor for a voltage study.
4	Do I pay a kW or kVA demand charge that contributes a significant portion of my bill, or are the largest motors direct-on-line (DOL) starter type?	☐ **Y:** consider: Swapping motor starters to star-delta or variable speed drives (VSDs) if motors run unloaded or variable (e.g. fans, water pumps and augers) Ensure that motors are not oversized and they are operating in an efficient region of their efficiency curve. Load shedding (turning off equipment automatically) Demand management (using embedded generation and load shedding together) Energy management systems (automated energy control system). ☐ **N:** Go to #5	Refer to your power bill to assess whether you are charged for demand (kW or kVA) or just power volume (kWh). You can complete a quick payback period by dividing the cost of the installation ($) by the money you would save each year ($ per year) to work out the payback period (years).

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5	Do I have a roof or ground mounted solar array optimised for my current operations?	☐ **Y:** Go to #6. ☐ **N:** as a first step, consider installing up to a 10 kW per phase (as these smaller system can receive rapid approval) or a 99 kW solar array as the economics are very strong for this size due to claiming small scale credits up front as a capital reduction. Discuss your options and the optimal size for your operations with a solar PV company.	When installing more than ~10 kW per phase, additional approval / grid stability studies may be required. Solar can be coupled with heat pumps to deliver very cost-effective heating of sheds and crates.
6	Does my power bill have a different tariff for peak and off peak power?	☐ **Y:** consider Load shifting (running loads late at night or weekends) Automatic timers to run loads late at night or weekends. Batteries to store excess PV solar and use at night. ☐ **N:** Go to #7.	Refer to your power bill to see if you have a peak and offpeak tarriff. Note that some bills may only be charged a flat rate; the above only applicable for time of use (ToU) tariffs.
7	Does pumping consume a large portion of total energy at my farm?	☐ **Y:** consider using PV solar pumping and installing a header tank / reservoir to take advantage of solar pumping. If pumping is the largest consumption of power on site, pumping during off peak periods into a reservoir can also be a low-cost energy storage strategy. ☐ **N:** Go to #8.	Solar pumping can be used for drinking water, bore water or waste effluent. Is installed in “island mode” (i.e. not using grid power) then approval from the power company is not required. Solar pumping can also have strong economics for remote bores to avoid the need for power cabling / trenching.
8	Have I already installed a manure anaerobic digester at my farm?	☐ **Y:** Go to #9. ☐ **N:** consider a stirred tank style digester plant to generate biogas. Note the importance of a well-considered business model to ensure the project is viable.	Coupled with high power and thermal fuel prices, biogas cogeneration has strong economic viability by reducing power and heating costs.
9	Do I operate a diesel or biogas engine?	☐ **Y:** consider hot water recovery in a water-glycol loop on the engine to provide heating. ☐ **N:** go to #10.	A closed loop circuit can exchange heat from engines into buildings without introducing exhaust gases.
10	Do I heat my sheds / crates by combusting a fossil fuel?	☐ **Y:** consider: oxygen trim (automated combustion air fan), economisers and condensing heat exchangers on the largest burners. a closed loop “dry heat” exchanger to improve air quality and reduce moisture. ☐ **N:** go to #11.	The heat for a closed loop circuit can come from solar thermal heat collectors with boosting from engine exhaust or gas burners. Large lagged tanks can be used to store heat.

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11	Do I heat my sheds / crates with electrical (resistance) heating of water? AND Am I on a time of use (ToU) tariff with different prices during peak and off peak periods?	☐ **Y:** consider: thermal storage via a well-insulated hot water tank. ☐ **N:** go to #12.	For farms using radiant heating, a closed loop hot water system with underfloor heating may be more cost effective. Hot water can come from solar thermal collectors, heat recovery on engines, biogas burners, biomass boilers or a gas booster.

	Potential Trigger	Response
12	Am I able to answer the following questions about my energy consumption? 1. Do I know what I pay per kilowatt-hour (kWh) of electricity and for access to power (i.e. kilowatt (kW) or kilovolt-amp (kVA) charges)? 2. Do I know what I pay per gigajoule-lower heating value (GJ LHV) of thermal energy including rucking and storage costs? 3. Can I compare options on a like for like basis to confidently make decisions on equipment and energy procurement. 4. Do I know what an acceptable threshold is for energy investment? E.g. Internal rate of return (IRR per cent), simple payback period, NPV, etc.	☐ **Y** ☐ **N:** For further assistance, contact: • An electrical contractor. • Energy retailers. • A solar retailer: Find an Approved Solar Retailer | Clean Energy Council. • An energy auditor; Register of auditors (**cleanenergyregulator.gov.au**). • Australian Pork.

Motor Terminology:

Direct-on-line:
Higher initial current required to start the motor, and a higher surge risk.

Star-delta:
Lower initial current, lower surge risk.

Variable-speed:
Allows motor to run at lower current, save significantly on power.

For more strategies to reduce energy use on your farm, see the "Understanding energy on your piggery" manual.

More Information

For a copy of the Sustainability Framework have a look on **APL's website** or contact Rowena Davis at **rowena.davis@australianpork.com.au**

For technical information, contact Gemma Wyburn at **gemma.wyburn@australianpork.com.au**